

FORM PTO-1449  
(REV. 7-80)  
(Title Amended 3/83)

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.

135016-1

SERIAL NO.

10/718,003

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT--

LIST OF ITEMS

Applicant

Ronald Scott Bunker et al.

Filing Date

November 19, 2003

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## U.S. PATENT DOCUMENTS

| EXAMINER<br>INITIAL | DOCUMENT NUMBER | DATE | NAME | CLASS | SUBCLASS | FILING DATE<br>IF APPROPRIATE |
|---------------------|-----------------|------|------|-------|----------|-------------------------------|
|                     | AA              |      |      |       |          |                               |
|                     | AB              |      |      |       |          |                               |
|                     | AC              |      |      |       |          |                               |
|                     | AD              |      |      |       |          |                               |
|                     | AE              |      |      |       |          |                               |
|                     | AF              |      |      |       |          |                               |
|                     | AG              |      |      |       |          |                               |
|                     | AH              |      |      |       |          |                               |
|                     | AI              |      |      |       |          |                               |
|                     | AJ              |      |      |       |          |                               |
|                     | AK              |      |      |       |          |                               |

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|--|----|-----------------|------|---------|-------|----------|-------------|----|
|  |    |                 |      |         |       |          | YES         | No |
|  | AL |                 |      |         |       |          |             |    |
|  | AM |                 |      |         |       |          |             |    |
|  | AN |                 |      |         |       |          |             |    |
|  | AO |                 |      |         |       |          |             |    |
|  | AP |                 |      |         |       |          |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |  |
|----|----|--|
| sk | AR | M. Ya Belen'kii et al., "Experimental Study of the Thermal and Hydraulic Characteristics of Heat-Transfer Surfaces Formed by Spherical Cavities," II. Polzunova Cent. Scientific Research, Translated from Teplofizika Vysokikh Temperatur, Vol.29, No.6, 1992 Plenum Pub. Corp., pp. 928-933. |
| sk | AS | Belen-kiy et al., "Heat Transfer Augmentation Using Surfaces Formed by a System of Spherical Cavities," ISSN1064-2269/93/0002-0196, Heat Transfer Research, Vol. 25, No. 2, 1993, pp.196-203   |
| sk | AT | Kesarev et al., "Convective Heat Transfer in Turbulized Flow Past a Hemispherical Cavity," Heat Transfer Research, Vol. 25, No. 2, 1993, pp. 156-160.  |

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|                     | BA              |      |      |       |          |                               |
|                     | BB              |      |      |       |          |                               |
|                     | BC              |      |      |       |          |                               |
|                     | BD              |      |      |       |          |                               |
|                     | BE              |      |      |       |          |                               |
|                     | BF              |      |      |       |          |                               |
|                     | BG              |      |      |       |          |                               |
|                     | BH              |      |      |       |          |                               |
|                     | BI              |      |      |       |          |                               |
|                     | BJ              |      |      |       |          |                               |
|                     | BK              |      |      |       |          |                               |

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|  |    |                 |      |         |       |          | YES         | No |
|  | BL |                 |      |         |       |          |             |    |
|  | BM |                 |      |         |       |          |             |    |
|  | BN |                 |      |         |       |          |             |    |
|  | BO |                 |      |         |       |          |             |    |
|  | BP |                 |      |         |       |          |             |    |

OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |   |
|----|----|---|
| fk | BR | N. Syred et al., "Effect of Surface Curvature on Heat Transfer and Hydrodynamics within a Single Hemispherical Dimple," Paper No. 2000-GT-236, Proceedings of ASME Turboexpo 2000, May 8-11, 2000, Munich Germany, pp. 1-6. |
| fk | BS | H. K. Moon et al., "Channel Height Effect on Heat Transfer and Friction in a Dimpled Passage," IGTI Turbo Expo, Paper No. 99-GT-163, Indianapolis, pp. 1-8  |
| fk | BT | C. Carcasi et al., "Heat Transfer and Pressure Drop Evaluation in Thin Wedge-Shaped Trailing Edge," Paper No. GT-2003-38197, IGTI Turbo Expo, June 16-19 Atlanta, Georgia, pp. 111-122.                                     |

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|                     | CA              |      |      |       |          |                               |
|                     | CB              |      |      |       |          |                               |
|                     | CC              |      |      |       |          |                               |
|                     | CD              |      |      |       |          |                               |
|                     | CE              |      |      |       |          |                               |
|                     | CF              |      |      |       |          |                               |
|                     | CG              |      |      |       |          |                               |
|                     | CH              |      |      |       |          |                               |
|                     | CI              |      |      |       |          |                               |
|                     | CJ              |      |      |       |          |                               |
|                     | CK              |      |      |       |          |                               |

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|  |                 |      |         |       |          | YES         | No |
|  | CL              |      |         |       |          |             |    |
|  | CM              |      |         |       |          |             |    |
|  | CN              |      |         |       |          |             |    |
|  | CO              |      |         |       |          |             |    |
|  | CP              |      |         |       |          |             |    |

OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |   |
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| fk | CR | M. K. Chyu et al., "Convective Heat Transfer of Cubic Fin Arrays in a Narrow Channel," Journal of Turbomachinery, April 1998, Vol. 120, pp. 362-367.  |
| JK | CS | N. Zhang et al., "Heat Transfer and Friction Loss Performance in Flow Networks with Multiple Intersections," Experimental Heat Transfer, Vol. 6, 1993, pp. 243-257.                                   |
| JK | CT | V. N. Afanas'Yev et al., "Thermohydraulics of Flow Over Isolated Depressions (Pits, Grooves) in a Smooth Wall," Heat Transfer Research, ISSN 1064-2285/93/0001-0022, Vol. 25, No. 1, 1993, pp. 22-56. |

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|---------------------|------------------|----------|-----------------|-------|----------|-------------------------------|
| JK                  | AA 6 6 0 7 3 5 5 | 08/19/03 | Cunha et al.    | —     | —        |                               |
|                     | AB 5 5 7 7 5 5 5 | 11/26/96 | Hisajima et al. | —     | —        |                               |
|                     | AC 5 6 9 0 4 7 2 | 11/25/97 | Lee             | —     | —        |                               |
|                     | AD 6 5 0 4 2 7 4 | 01/07/03 | Bunker et al.   | —     | —        |                               |
|                     | AE 5 3 7 0 4 9 9 | 12/06/94 | Lee             | —     | —        |                               |
|                     | AF 6 4 0 2 4 7 0 | 01/11/02 | Kvasnak et al.  | —     | —        |                               |
|                     | AG 6 0 9 8 3 9 7 | 08/08/00 | Glezer et al.   | —     | —        |                               |
|                     | AH 3 6 6 4 9 2 8 | 05/23/72 | Roberts         | —     | —        |                               |
|                     | AI 4 6 9 0 2 1 1 | 09/01/87 | Kuwahara et al. | —     | —        |                               |
|                     | AJ 3 2 2 9 7 6 3 | 01/18/66 | Rosenblad       | —     | —        |                               |
| ✓                   | AK 3 8 9 9 8 8 2 | 08/19/75 | Parker          | —     | —        |                               |

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|----|----|-----------------|----------|---------|-------|----------|-------------|----|
|    |    |                 |          |         |       |          | YES         | No |
| JK | AL | 1 1 1 1 1 9 0   | 06/27/01 | EP      | —     | —        |             |    |
|    | AM | 1 6 4 9 0 1 A   | 06/19/01 | JP      | —     | —        |             |    |
|    | AN | 2 8 0 3 9 0     | 12/10/86 | JP      | —     | —        |             |    |
|    | AO | 2 1 7 9 9 4     | 08/19/97 | JP      | —     | —        |             |    |
| ✓  | AP | 8 1 1 0 0 1 2   | 04/30/96 | JP      | —     | —        |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages, Etc.)

|    |    |  |
|----|----|--|
| JK | AR | Patent Application, Ronald Scott Bunker et al., Serial Number 10/462,755, filed June 6, 2002, Docket Number - RD29163. |
| JK | AS | Patent Application, Ronald Scott Bunker, Serial Number 10/065,115, filed September 18, 2002, Docket Number - RD29461.  |
| JK | AT | US20030086785 A1, Bunker, "Cooling passages and methods of fabrication," Published 05/08/2003.                         |

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|----------------------|------------------|----------|------------------|-------|----------|-------------------------------|
| JK                   | BA 4 1 5 8 9 4 9 | 06/26/79 | Reider           | —     | —        |                               |
|                      | BB 4 8 3 8 0 3 1 | 06/13/89 | Cramer           | —     | —        |                               |
|                      | BC 4 1 8 4 3 2 6 | 01/22/80 | Pane, Jr. et al. | —     | —        |                               |
|                      | BD 5 3 5 3 8 6 5 | 10/11/94 | Adiutori et al.  | —     | —        |                               |
|                      | BE 5 4 6 0 0 0 2 | 10/24/95 | Correa           | —     | —        |                               |
|                      | BF 5 6 5 1 6 6 2 | 07/29/97 | Lee et al.       | —     | —        |                               |
|                      | BG 5 7 5 8 5 0 3 | 06/02/98 | DuBell et al.    | —     | —        |                               |
|                      | BH 6 1 3 4 8 7 7 | 10/24/00 | Alkabie          | —     | —        |                               |
|                      | BI 6 2 3 7 3 4 4 | 05/29/01 | Lee              | —     | —        |                               |
|                      | BJ 6 3 3 4 3 1 0 | 01/01/02 | Sutcu et al.     | —     | —        |                               |
| ✓                    | BK 6 4 0 8 6 2 9 | 06/25/02 | Harris et al.    | —     | —        |                               |

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|  | BP              |      |         |       |          |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |  |
|----|----|--|
| JK | BR | US20030203259 A1, Bunker, "Fluid passages for power generation equipment," Published 10/30/2003.                 |
| JK | BS | Patent Application, Ronald Scott Bunker, Serial No.10/064,605, filed July 30, 2002, Document Number 124626.      |
| JK | BT | Patent Application, Ronald Scott Bunker, Serial No. 10/065,495, filed October 24, 2002, Document Number RD29577. |

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|---------------------|------------------|----------|----------------|-------|----------|-------------------------------|
| JK                  | CA 6 4 1 2 2 6 8 | 07/02/02 | Cromer et al.  | —     | —        |                               |
|                     | CB 6 4 9 4 0 4 4 | 12/17/02 | Bland          | —     | —        |                               |
|                     | CC 6 5 2 6 7 5 6 | 03/04/03 | Johnson et al. | —     | —        |                               |
|                     | CD 5 3 6 1 8 2 8 | 11/08/94 | Lee et al.     | —     | —        |                               |
|                     | CE 5 4 2 1 1 5 8 | 06/06/95 | Stenger et al. | —     | —        |                               |
|                     | CF 5 6 5 1 6 6 2 | 07/29/97 | Lee et al.     | —     | —        |                               |
|                     | CG 5 6 8 1 1 4 4 | 10/28/97 | Spring et al.  | —     | —        |                               |
|                     | CH 5 6 6 0 5 2 5 | 08/26/97 | Lee et al.     | —     | —        |                               |
|                     | CI 5 6 9 5 3 2 1 | 12/09/97 | Kercher        | —     | —        |                               |
|                     | CJ 5 7 2 4 8 1 6 | 03/10/98 | Ritter et al.  | —     | —        |                               |
| ✓                   | CK 5 7 3 8 4 9 3 | 04/14/98 | Lee et al.     | —     | —        |                               |

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|  |                 |      |         |       |          | YES         | No |
|  | CL              |      |         |       |          |             |    |
|  | CM              |      |         |       |          |             |    |
|  | CN              |      |         |       |          |             |    |
|  | CO              |      |         |       |          |             |    |
|  | CP              |      |         |       |          |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |  |
|----|----|--|
| JK | CR | Patent Application, Ronald Scott Bunker et al., Serial Number 10/162,756, filed June 6, 2002, Docket Number RD29188. |
| JK | CS | Patent Application, Ronald Scott Bunker, Serial Number 10/065,814, filed November 22, 2002, Docket Number RD29580.   |
| JK | CT | Patent Application, Ronald Scott Bunker, Serial Number 10/301,672, filed November 22, 2002, Docket Number 120497.    |

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|---------------------|------------------|----------|-----------------|-------|----------|-------------------------------|
| JK                  | DA 5 7 9 7 7 2 6 | 08/25/98 | Lee             | —     | —        |                               |
|                     | DB 5 8 2 2 8 5 3 | 10/20/98 | Ritter et al.   | —     | —        |                               |
|                     | DC 5 9 3 3 6 9 9 | 08/03/99 | Ritter et al.   | —     | —        |                               |
|                     | DD 5 9 7 5 8 5 0 | 11/02/99 | Abuaf et al.    | —     | —        |                               |
|                     | DE 6 1 9 0 1 2 0 | 02/20/01 | Thatcher et al. | —     | —        |                               |
|                     | DF 5 4 0 2 4 6 4 | 03/28/95 | Schenk et al.   | —     | —        |                               |
|                     | DG 6 4 6 8 6 6 9 | 10/22/02 | Hasz et al.     | —     | —        |                               |
|                     | DH 1 8 4 8 3 7 5 | 03/08/32 | Muir            | —     | —        |                               |
| ✓                   | DI 2 9 3 8 3 3 3 | 05/31/60 | Wetzler         | —     | —        |                               |
|                     | DJ               |          |                 |       |          |                               |
|                     | DK               |          |                 |       |          |                               |

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|  |                 |      |         |       |          | YES         | No |
|  | DL              |      |         |       |          |             |    |
|  | DM              |      |         |       |          |             |    |
|  | DN              |      |         |       |          |             |    |
|  | DO              |      |         |       |          |             |    |
|  | DP              |      |         |       |          |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |   |
|----|----|---|
| JK | DR | Patent Application, Ronald Scott Bunker, Serial Number 10/065,108, filed September 18, 2002, Docket Number RD29153. |
|    | DS |   |
|    | DT |   |

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|                     | EA              |      |      |       |          |                               |
|                     | EB              |      |      |       |          |                               |
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|                     | EF              |      |      |       |          |                               |
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|                     | EH              |      |      |       |          |                               |
|                     | EI              |      |      |       |          |                               |
|                     | EJ              |      |      |       |          |                               |
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|  | EL              |      |         |       |          |             |    |
|  | EM              |      |         |       |          |             |    |
|  | EN              |      |         |       |          |             |    |
|  | EO              |      |         |       |          |             |    |
|  | EP              |      |         |       |          |             |    |

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|    |    |   |
|----|----|---|
| JK | ER | K. Takeishi et al., "Heat Transfer Characteristics Of A Flow Passage With Long Pin Fins And Improving Heat Transfer Coefficient By Adding Turbulence Promoters On A Endwall, " Paper No. 2001-GT-178, IGTI Turbo Expo, New Orleans, pp. 1-12. |
| JK | ES | S. Anzai et al., "Effect of the Shape of Turbulence Promoter Ribs on Heat Transfer and Pressure Loss Characteristics", Bulletin of the Gas Turbine Society of Japan, 1992.  |
| JK | ET |   |

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|                      | DC              |      |      |       |          |                               |
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|                      | DE              |      |      |       |          |                               |
|                      | DF              |      |      |       |          |                               |
|                      | DG              |      |      |       |          |                               |
|                      | DH              |      |      |       |          |                               |
|                      | DI              |      |      |       |          |                               |
|                      | DJ              |      |      |       |          |                               |
|                      | DK              |      |      |       |          |                               |

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|  | DL              |      |         |       |          |             |    |
|  | DM              |      |         |       |          |             |    |
|  | DN              |      |         |       |          |             |    |
|  | DO              |      |         |       |          |             |    |
|  | DP              |      |         |       |          |             |    |

## OTHER INFORMATION (Including Author, Title, Date, Pertinent pages. Etc.)

|    |    |  |
|----|----|--|
| fk | DR | V. N. Afanas'yev et al., "Heat Transfer and Friction on Surfaces Contoured by Spherical Depressions," Heat Transfer Research, Vol. 24, No. 1, 1992. pp. 24-105.                            |
| fk | DS | V. N. Afanasyev et al., "Turbulent Flow Friction and Heat Transfer Characteristics for Spherical Cavities on a Flat Plate," Experimental Thermal and Fluid Science, 1993, Vol. 7, pp. 1-8. |
| fk | DT | D. E. Metzger et al., "Developing Heat Transfer in Rectangular Ducts with Staggered Arrays of Short Pin Fins", Journal of Heat Transfer, Vol. 104, November 1982, pp. 100-706.             |

EXAMINER

DATE CONSIDERED

5/25/05

\*EXAMINER: Initial reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.